

WEST VISAYAS STATE UNIVERSITY
COLLEGE OF EDUCATION
GRADUATE SCHOOL
Iloilo City

**BUILDING A PROFESSIONAL LEARNING COMMUNITY IN ELEMENTARY
SCIENCE EDUCATION USING A SOCIOSCIENTIFIC ISSUE
CASE-BASED PEDAGOGY**

A Thesis Presented to the
Faculty of the Graduate School
College of Education
West Visayas State University
La Paz, Iloilo City

In Partial fulfillment
of the Requirements for the Degree
Master of Arts in Education
(Elementary Science)

by
Sharon M. Jaudian

April 2018

WEST VISAYAS STATE UNIVERSITY
COLLEGE OF EDUCATION
GRADUATE SCHOOL
Iloilo City

APPROVAL SHEET

A Thesis for the Degree
Master of Arts in Education
(Elementary Science)

by

Sharon M. Jaudian

Approved by the Research Committee:

VILMA C. TEMPLORA, Ph.D., Chair

LEA C. TINGSON, M.A.Ed., Member

RYANN A. CATILO, M.A.Ed., Outside Expert

VICENTE C. HANDA, Ph.D., Adviser

HILDA C. MONTAÑO, Ed.D., RGC
Dean

April 2018

WEST VISAYAS STATE UNIVERSITY
COLLEGE OF EDUCATION
GRADUATE SCHOOL
Iloilo City

Jaudian, Sharon M. "*Building a Professional Learning Community in Elementary Science Education Using a Socioscientific Issue Case-based Pedagogy*". An unpublished Master of Arts in Education (Elementary Science) Thesis, College of Education, West Visayas State University, Iloilo City, April 2018.

Abstract

This study was conducted in response to the need of creating a professional learning community (PLC) among elementary science educators that engage in addressing socioscientific issues (SSI) using case-based pedagogy (CBP). The study was conducted in an elementary school in one of the districts of the Province of Iloilo. Five elementary science teachers regularly met for the discussion of written cases that embody situated knowledge involving societal issues that have conceptual links to science. The discussion of cases commenced with the presentation of cases of the teacher participants who experienced the dilemma themselves. This was followed by the focus group discussions involving tensions and dilemmas in teaching inquiry-based socioscientific issues (SSI). The sources of data included written cases authored by the teacher himself, minutes of the meetings, transcripts of focus group discussions, audio recordings and photographs. Multi-layered narrative analysis was employed to clearly represent the data. The findings of the study revealed that there are various societal, environmental, and moral issues that have influenced the science classroom. These issues of tension and dilemma included (a) tension of community practice versus ideal practice, (b) confusion of conviction, (c) poverty; (d) tension of locality, (e) morality code; and (f) tension of authority. In this regard, teacher participants learned that (a) a PLC is a needed learning space that provides a collaborative bottom-up professional development context that is

WEST VISAYAS STATE UNIVERSITY
COLLEGE OF EDUCATION
GRADUATE SCHOOL
Iloilo City

most supportive of the learning of science educators, and (b) the utilization of socioscientific-based case experience as a context for the PLC is an eye-opener to the science-linked contemporary, and sometimes even controversial societal, environmental, and moral issues that influence and challenge science teaching and learning. The teacher participants recognized that they have a significant role in educating the learner's minds and hearts, and guiding them to use this knowledge to become responsible citizens. Furthermore, the group connected their learnings into practice which included the creation of inquiry-based SSI lesson plans. Finally, a model of the SSI-based case experience was created that outlined the progression and flow of the PLC activity. In all its value, this study is but a slice of a larger undertaking and pursuit aimed towards the professional development of elementary science educators.

Keywords: professional learning community, professional development, case-based-pedagogy, socioscientific issue, reflective practice

WEST VISAYAS STATE UNIVERSITY
COLLEGE OF EDUCATION
GRADUATE SCHOOL
Iloilo City

Table of Contents

	Page
Title Page	i
Approval Sheet	ii
Acknowledgment	iii
Abstract	vi
Table of Contents	viii
List of Tables	xi
List of Figures	xii
List of Photographs	xiii
List of Appendices	xv
Chapter	
1 INTRODUCTION TO THE STUDY	1
Prologue	1
Background of the Study	3
Research Purpose and Questions	6
Epistemological and Theoretical Framework	6
Definition of Terms	13
Significance of the Study	15
2 REVIEW OF RELATED LITERATURE	18
The Shifting Emphasis in Teacher Professional Development	18
Professional Learning Community: Unpacking the Concept	22

WEST VISAYAS STATE UNIVERSITY
COLLEGE OF EDUCATION
GRADUATE SCHOOL
Iloilo City

	Case-based Pedagogy: A Potential Vehicle for Building PLC in Elementary Science	28
	Socioscientific Issues	32
	Reflective Practice	35
3	METHODOLOGY	38
	Participatory Narrative Inquiry Approach	38
	Participants in the Study	41
	Setting of the Study	43
	Procedures of the Study	44
	Data Sources	45
	Data Analysis	46
	Ethical Considerations	49
	Subjectivity Statement	50
4	RESULTS	53
	The Researcher's Tipping Point	53
	The Revelation of Dilemmas and Tensions through the SSI Case Experience	54
	Ma'am Faith's Case: Nakabasa-basa Ka na sa Putos sang Ibos?: An Issue of Waste Disposal	54
	Ma'am Mary Grace's Case: Of Kabogs, Kisames, and Care	63
	Ma'am Abigail's Case: Never been to the Beach?	70
	Sir Joshua's Case: Magnetism and Mutualism?	78
	Ma'am Ruth's Case: Macky, Macky Quite Contrary	85

WEST VISAYAS STATE UNIVERSITY
COLLEGE OF EDUCATION
GRADUATE SCHOOL
Iloilo City

	Lessons Learned through the SSI-based Experience	94
	SSI-based Case Experience: A Context for Creating a Reflective PLC	99
5	SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS	109
	Summary	109
	Conclusions	112
	Recommendations	115
	REFERENCES	117
	APPENDICES	127

WEST VISAYAS STATE UNIVERSITY
COLLEGE OF EDUCATION
GRADUATE SCHOOL
Iloilo City

List of Tables

Table		Page
1	Overview of the Epistemological and Theoretical Framework of the Study	6
2	Overview of the Shifting Emphasis in Teacher Professional Development According to Roberts and Pruitt (2008)	232
3	Legend A: Voices of the Teacher Participants	47
4	Legend B: Sources of Data	47
5	The SSI-based Case Experience Chart	104

WEST VISAYAS STATE UNIVERSITY
COLLEGE OF EDUCATION
GRADUATE SCHOOL
Iloilo City

List of Figures

Figure		Page
1	Socioscientific Elements of Functional Scientific Literacy	35
2	Participatory Narrative Inquiry Approach Process	39
3	SSI-based Case Experience Model	108

WEST VISAYAS STATE UNIVERSITY
COLLEGE OF EDUCATION
GRADUATE SCHOOL
Iloilo City

List of Photographs

Photograph	Page
1 The school's total enrolment for October 2017	44
2 Sample Study Information and Consent Form	50
3 Ma'am Faith retelling her experience in teaching waste disposal	56
4 Ma'am Faith's written case	58
5 Ma'am Abigail demonstrating how a 'supot' for sugar is made	60
6 Ma'am Ruth telling of her experience as a child working in the wet market, and being expert in wrapping dried fish in old newspaper	61
7 Ma'am Mary Grace probing for ideas about the benefits of animals to humans	64
8 Grade three learners writing about ways to care for lizards, spiders, frogs and bats	65
9 A bat surprisingly flew from the classroom ceiling and landed directly at the researcher's table	66
10 A learner's output on the benefits of animals to humans	67
11 Ma'am Mary Grace's written case	68
12 Ma'am Abigail's written case	70
13 Ma'am Abigail teaching about conservation of estuaries and intertidal zones	71
14 Atom Araullo's documentary of the Philippine seas as seen on television	72
15 Focus group discussion of Ma'am Abigail's case	73

WEST VISAYAS STATE UNIVERSITY
COLLEGE OF EDUCATION
GRADUATE SCHOOL
Iloilo City

16	A well-known stream (tributary) in the poblacion	75
17	Sir Joshua teaching about magnetism	79
18	Sir Joshua's written case	81
19	Magnets used by Sir Joshua to demonstrate that opposite poles attract and like poles repel	82
20	Sir Joshua discusses his case	83
21	Ma'am Ruth's written case	85
22	Ma'am Ruth teaching about care for the environment	87
23	The lively focus group discussion of Ma'am Ruth's case	88
24	Ma'am Ruth's lesson "Pag-amlig sa Palibot"	90
25	"Children Learn What They Live" by Dorothy Law Nolte	93
26	Ma'am Faith on the necessity of a PLC	95
27	Focus group discussion	96
28	Ma'am Abigail's notes	98
29	First PLC orientation meeting	100
30	Brainstorming session	102

WEST VISAYAS STATE UNIVERSITY
COLLEGE OF EDUCATION
GRADUATE SCHOOL
Iloilo City

List of Appendices

Appendix	Page
A Letter of Permission	128
B Study Information and Consent Form	130
C Teacher Profile Sheet	133
D Sample Transcript of the PLC Focus Group Discussion	135
E Inquiry-based SSI Lesson Plans	142

References

- Allchin, D. (2013). Problem-and case-based learning in science: An introduction to distinctions, values, and outcomes. CBE-Life Sciences Education.
- Arellano, E. L., Barcenal, T. L., Bilbao, P. P., Castellano, M. A., Nichols, S.E., & Tippins, D. J. (2001). Case-based pedagogy as a context for collaborative inquiry in the Philippines. *Journal of Research in Science Teaching*.
- Arellano, E. L., Barcenal, T. L., Bilbao, P. P., Castellano, M. A., Nichols, S. E., & Tippins, D. J. (2001). Using case-based pedagogy in the Philippines: A narrative inquiry. *Research in Science Education*.
- Baker, D. (2015). Mass higher education and the super research university. *International Higher Education*.
- Barcenal, T. L., Bilbao P. P., Morano L. N., Nichols S. E. & Tippins, D. J. (2002). *Just in Case: Encounters in Science and Mathematics Teaching and Learning*. West Visayas State University Printing Press.
- Blumer, H. (1969). *Symbolic interactionism: Perspective and method*. Englewood Cliffs, N.J: Prentice-Hall.
- Caena, F. (2011). Literature review Quality in Teachers' continuing professional development. *Education and training*, 2020.
- Cochran-Smith, M., & Lytle, S. L. (Eds.). (1993). *Inside/outside: Teacher research and knowledge*. Teachers College Press.
- Connelly, F. M., & Clandinin, D. J. (1990). Stories of experience and narrative inquiry. *Educational researcher*, 19(5), 2-14.

WEST VISAYAS STATE UNIVERSITY
COLLEGE OF EDUCATION
GRADUATE SCHOOL
Iloilo City

119

┌

└

Crotty, M. (1998). *The foundations of social research: Meaning and perspective in the research process*. Sage.

Crotty, M. (2003) *The Foundations of Social Research*. Cap1 Uploaded by William Rocha, sage publications, thousand oaks, *The Foundation of Social Research: Meaning and Perspective in the Research process*. Retrieved from <https://www.scribd.com/document/298864013/S-2-Crotty-M-2003-the-Foundations-of-Social-Research-Cap1>

Darling-Hammond, L., & Bransford, J. (Eds.). (2007). *Preparing teachers for a changing world: What teachers should learn and be able to do*. John Wiley & Sons.

Darling-Hammond, L., & McLaughlin, M. W. (1995). *Policies that support professional development in an era of reform*. Phi delta kappan.

Dass, P. M., & Yager, R. E. (2009). *Professional development of science teachers: History of reform and contributions of the STS-based Iowa Chautauquan Program*. *Science Education Review*.

Day, C., & Gu, Q. (2007). *Variations in the conditions for teachers' professional learning and development: Sustaining commitment and effectiveness over a career*. *Oxford Review of Education - Special Issue, 33(4)*, 423-443. doi: 0.1080/03054980701450746

Denzin, N. K., & Lincoln, Y. (2000). *Qualitative research*. Thousand Oaks ua.

DepEd Mission

DepEd Order No. 35, s. 2016

DuFour, R. (2004). *What is a "professional learning community"?. Educational leadership*.

└

┌

WEST VISAYAS STATE UNIVERSITY
COLLEGE OF EDUCATION
GRADUATE SCHOOL
Iloilo City

120

┌
DuFour, R., & DuFour, R. (2013). Learning by doing: A handbook for professional learning communities at work TM. Solution Tree Press.

DuFour, R., DuFour, R., Eaker, R., & Many, T. (2016). Learning by doing. Solution Tree Press.

Dworkin, R. (1986). Law's empire. Cambridge, Mass: Belknap Press.

Futernick, K. (2007). A possible dream: Retaining California teachers so all students learn (Vol. 2, No. 10). Sacramento: California State University.

Glaserfeld, E. . (1995). Radical constructivism: A way of knowing and learning. London: Falmer Press.

Gove, P. B., & Merriam-Webster, Inc. (1986). Webster's third new international dictionary of the English language unabridged. Springfield, Mass., U.S.A: Merriam-Webster.

Gray, D. E. (2004). Theoretical perspectives and research methodologies. Sage, USA.

Gu, Q., & Day, C. (2007). Teachers resilience: A necessary condition for effectiveness. Teaching and Teacher education.

Guskey, T. R., & Huberman, M. (1995). Professional development in education: New paradigms and practices. Teachers College Press, 1234 Amsterdam Avenue, New York, NY 10027.

Hord, S. M. (1997). Professional learning communities: Communities of continuous inquiry and improvement.

Hord, S. M. (2009). Professional learning communities. Journal of Staff Development.

└

WEST VISAYAS STATE UNIVERSITY
COLLEGE OF EDUCATION
GRADUATE SCHOOL
Iloilo City

121

┌

┐

- Hord, S. M. (Ed.). (2004). Learning together, leading together: Changing schools through professional learning communities. Teachers College Press.
- Hord, S. M., & Hirsh, S. A. (2008). Making the promise a reality. Sustaining professional learning communities.
- <http://fod.msu.edu/oir/case-based-teaching>
- <http://www.forestinfo.org/careers/science-teacher>
- <https://www.sheffield.ac.uk/lets/toolkit/learning/reflective>
- Kleinfeld, J., McDiarmid, G. W., Parrett, W., & Kleinfeld, J. (1992). Inventive teaching: The heart of the small school. Fairbanks: University of Alaska Fairbanks.
- Koballa, T., & Tippins, D. (2000). Cases in middle and secondary school science: The promise and dilemmas.
- Kruze, S., Louis, K. S., & Bryk, A. (1994). Building professional community in schools. Issues in restructuring schools.
- Kunzman, R. (2003). From teacher to student: The value of teacher education for experienced teachers. Journal of Teacher Education.
- Lave, J., & Wenger, E. (1991). Situated learning: Legitimate peripheral participation. Cambridge university press.
- Law, N., Yuen, A., & Fox, R. (2011). Educational innovations beyond technology: Nurturing leadership and establishing learning organizations. Springer Science & Business Media.
- Lieberman, A. (1995). Practices that support teacher development. Phi delta kappan.

└

┘

WEST VISAYAS STATE UNIVERSITY
COLLEGE OF EDUCATION
GRADUATE SCHOOL
Iloilo City

122

- Little, J. W. (2003). Inside teacher community: Representations of classroom practice. Teachers college record.
- Louis, K. S., & Kruse, S. D. (1995). Professionalism and community: Perspectives on reforming urban schools. SAGE Publications Ltd.
- Louis, K. S., & Marks, H. M. (1998). Does professional community affect the classroom? Teachers' work and student experiences in restructuring schools. American journal of education.
- Loving, C. C., Lowy, S. W., & Martin, C. (2003). Recognizing and solving ethical dilemmas in diverse science classrooms. In The role of moral reasoning on socioscientific issues and discourse in science education (pp. 183-194). Springer Netherlands.
- Lundeberg, M. A. (1999). Discovering teaching and learning through cases. Who learns what from cases and how, 3-23. Retrieved from <http://edglossary.org/professional-learning-community/>
- Margolis, J. (2008). When teachers face teachers: Listening to the resource "right down the hall". Teaching Education.
- Matland, R. E. (1995). Synthesizing the implementation literature: The ambiguity-conflict model of policy implementation. Journal of public administration research and theory.
- May, T., & Williams, M. (2002). An introduction to the philosophy of social research. Routledge.

WEST VISAYAS STATE UNIVERSITY
COLLEGE OF EDUCATION
GRADUATE SCHOOL
Iloilo City

123

McLaughlin, M. W., & Talbert, J. E. (2010). Professional learning communities: Building blocks for school culture and student learning. *Voices in Urban Education*.

Mensah, F. M. (2010). Toward the mark of empowering policies in elementary school science programs and teacher professional development. *Cultural Studies of Science Education*.

Merseth, K. K. (1996). Cases and case methods in teacher education. *Handbook of research on teacher education*.

Moon, J. A. (2004). *A handbook of reflective and experiential learning: Theory and practice*. Psychology Press.

National Research Council (U.S.). (1996). *National Science Education Standards: Observe, interact, change, learn*. Washington, DC: National Academy Press.

Polkinghorne, D. E. (1995). Narrative configuration in qualitative analysis. *International journal of qualitative studies in education*, 8(1), 5-23.

Polkinghorne, D. E. (1988). *Narrative knowing and the human sciences*. Suny Press.

PRC Resoultion No. 179, Series of 2004

PRC Resolution No. 466, Series of 2008

PRC Resolution No. 774, Series of 2013

Randall, M. (1995). *Our voices, our lives: Stories of women from Central America and the Caribbean*. Common Courage Pr.

Roberts, S. M., & Pruitt, E. Z. (Eds.). (2008). *Schools as professional learning communities: Collaborative activities and strategies for professional development*. Corwin Press.

WEST VISAYAS STATE UNIVERSITY
COLLEGE OF EDUCATION
GRADUATE SCHOOL
Iloilo City

124

- Roger T. Cross, Robert E. Yager, Parents, Social Responsibility and Science, Technology and Society (STS): A rationale for reform, Research in Science & Technological Education.
- Sadler, T. D. (2004). Informal reasoning regarding socioscientific issues: A critical review of research. *Journal of research in science teaching*.
- Sadler, T. D. (2011). Socio-scientific issues-based education: What we know about science education in the context of SSI. In *Socio-scientific Issues in the Classroom*. Springer Netherlands.
- Sadler, T. D., & Zeidler, D. L. (2004). The morality of socioscientific issues: Construal and resolution of genetic engineering dilemmas. *Science education*.
- Schank, R. C. (1999). *Dynamic memory revisited*. Cambridge University Press. Retrieved from https://scholar.google.com.ph/scholar?hl=en&as_sdt=0%2C5&q=Schank%2C+1999&btnG
- Schön, D. A. (1987). *Educating the reflective practitioner: Toward a new design for teaching and learning in the professions*. Jossey-Bass.
- Seashore, K., Anderson, A., & Riedel, E. (2003). *Implementing arts for academic achievement: The impact of mental models, professional community and interdisciplinary teaming*.
- Sparks, G. M. (1983). *Synthesis of research on staff development for effective teaching*. Educational leadership.

WEST VISAYAS STATE UNIVERSITY
COLLEGE OF EDUCATION
GRADUATE SCHOOL
Iloilo City

125

- Thanh, N. C., & Thanh, T. T. (2015). The interconnection between interpretivist paradigm and qualitative methods in Education. *American Journal of Educational Science*.
- Tippins, D. J., Nichols, S. E., & Dana, T. M. (1999). Exploring novice and experienced elementary teachers' science teaching and learning referents through videocases. *Research in Science Education*, 29(3), 331-352.
- Toole, J. C., & Louis, K. S. (2002). The role of professional learning communities in international education. *Second international handbook of educational leadership and administration*.
- Westheimer, J. (1999). Communities and consequences: An inquiry into ideology and practice in teachers' professional work. *Educational Administration Quarterly*.
- Willis, J. W., & Jost, M. (2007). *Foundations of qualitative research: Interpretive and critical approaches*. Sage.
- Wilson, S. M. (2013). Professional development for science teachers. *Science*.
- Z Grant, C. A., & Zeichner, K. M. (1984). On becoming a reflective teacher. *Preparing for reflective teaching*. Boston: Allyn and Bacon.
- Zeichner, Kenneth M.. (2008). A critical analysis of reflection as a goal for teacher education. *Educação & Sociedade*, 29(103), 535-554. <https://dx.doi.org/10.1590/S0101-73302008000200012>
- Zeidler, D. L., Sadler, T. D., Simmons, M. L., & Howes, E. V. (2005). Beyond STS: A research-based framework for socioscientific issues education. *Science Education*.

WEST VISAYAS STATE UNIVERSITY
COLLEGE OF EDUCATION
GRADUATE SCHOOL
Iloilo City

126

Zeidler, D. L., Walker, K. A., Ackett, W. A., & Simmons, M. L. (2002). Tangled up in views: Beliefs in the nature of science and responses to socioscientific dilemmas. *Science education*.

Zepeda, S. J. (2012). *Professional development: What works*. Larchmont, NY: Eye on Education.